Center Independent Research & Development: GSFC IRAD

LIDAR for atmospheric backscatter and temperature measurements

Completed Technology Project (2013 - 2014)

Project Introduction

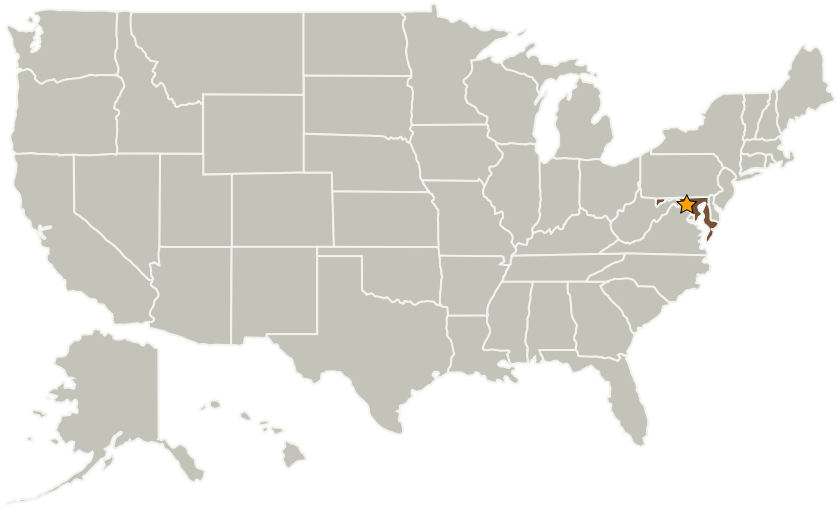
We propose to demonstrate key capabilities of a multifunctional atmospheric lidar. This lidar could be part of a Surface Weather Station to measure atmospheric backscatter profiles and temperature. These measurements address high priority needs as summarized in the 2011 Planetary Decadal Survey. We propose to demonstrate key capabilities of a multifunctional atmospheric lidar for a Mars lander. This lidar could be part of a Surface Weather Station to measure atmospheric backscatter profiles and temperature. These measurements address high priority needs for Mars science as summarized in the 2011 Planetary Decadal Survey and the last Mars 2020 Science Definition Team Final Report (2013).

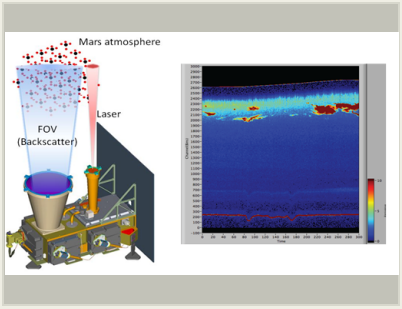
The objectives of this effort are to measure atmospheric backscatter profiles and temperature using a zenith looking lidar, designed for a small lander. The lidar will also measure temperature by scanning over two adjacent CO2 lines at 1572 nm that have different temperature sensitivities.

Anticipated Benefits

N/A

Primary U.S. Work Locations and Key Partners





Mars Lander LIDAR Measurement backscatter Concept with an example of a CO2 backscatter profile

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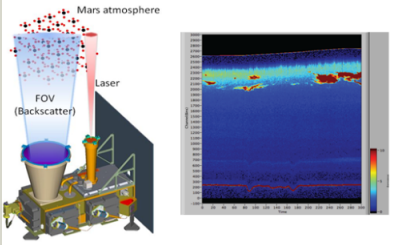
Organizations Performing Work	Role	Type	Location
★Goddard Space Flight Center(GSFC)	Lead Organization	NASA Center	Greenbelt, Maryland

Primary U.S. Work Locations
Maryland

Images



Mars Lander LIDAR for atmospheric backscatter and temperature measurements
Mars Lander LIDAR Measurement backscatter Concept with an example of a CO2 backscatter profile
(https://techport.nasa.gov/image/2658)

Project Website:

http://sciences.gsfc.nasa.gov/sed/

Organizational Responsibility

Responsible Mission Directorate:
Mission Support Directorate (MSD)

Lead Center / Facility:
Goddard Space Flight Center (GSFC)

Responsible Program:
Center Independent Research & Development: GSFC IRAD

Project Management

Program Manager:
Peter M Hughes

Project Manager:
Brook Lakew

Principal Investigator:
Haris Riris

Co-Investigators:
Michael D Smith
Stewart T Wu

LIDAR for atmospheric backscatter and temperature measurements

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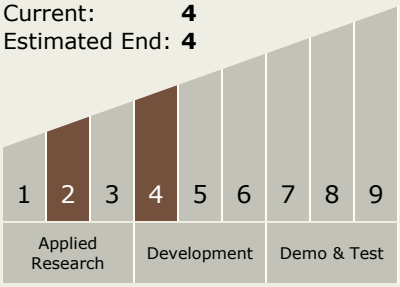
Technology Maturity (TRL)

Start: **2**
Current: **4**
Estimated End: **4**



Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.1 Remote Sensing Instruments/Sensors
    - TX08.1.5 Lasers